Mimicry in two southern weeds

Roland M. Harper

On a spring day about twelve years ago some acquaintance in Tallahassee, Florida, brought me for identification a living rosette of pinnatifid leaves an inch or less in length. Without flowers or fruit the best guess I could make was that it was a little Cruciferous weed, known at different times as *Senebiera pinnatifida*, *Coronopus didymus*, and *Carara didyma*. If I had been sufficiently interested I could have found where it came from and watched it until it bloomed, but I was too engrossed with other matters, and the weed did not seem important.

There the matter rested until April 25, 1927, when I found what was evidently the same plant on a roadside near a barnyard in Dallas County, Alabama. It showed then in the middle of each rosette a sessile head of small woolly achenes. No corolla or stamens could be detected, even in the youngest plants, and I did not even know the family, until specimens were sent to the National Herbarium and New York Botanical Garden, and identified as a species of *Soliva* or *Gymnostyles* (Compositae). There was still some uncertainty about the species, on account of rather inadequate descriptions in the books, but a note on the occurrence of the same species in Louisiana, published soon afterward by Prof. Clair A. Brown,[1] and some extracts from the original description, kindly supplied by him, helped clear up the difficulty.

Since then I have seen it in or near Quincy and Tallahassee, Florida; Thomasville, Georgia; and in Talladega, Tuscaloosa, Autauga, Dallas and perhaps other counties in Alabama; Wilkinson County, Mississippi; and in a few places in Louisiana (Prof. Brown being with me at some of them in April, 1936). It is probably fairly widely distributed in these states now, but whether it has been there a long time, and been overlooked on account of its small size, or has extended its range lately, it is hard to say. Its favorite habitat is firm soil in dooryards, barnyards, roadsides, etc., where the grass is sparse or absent; and, like *Juncus tenuis*, it seems to thrive where people walk on it. It commonly grows in small colonies, with the individual

[1] Torreya, **29**: 155, 1929.

rosettes connected by filiform stolons just beneath the surface of the ground.

Under the name *Soliva nasturtiifolia* it is recorded in Chapman's Flora of the Southern United States (1860) as occurring around Charleston, S. C., introduced, but with no indication of its native country or its habitat in South Carolina. No such plant is listed in Mohr's Plant Life of Alabama (1901). It appears in Small's Flora of the Southeastern United States (1903 and 1913) under the same name, and in his Manual of the Southeastern Flora (1933) as *Gymnostyles nasturtiifolia*. In Small's Flora its range is given as from North Carolina to Florida, with no intimation that it grows in any other country; but in his Manual its range is extended west to Louisiana, and it is said to be native of South America.

In the first paragraph I mentioned the resemblance of *Gymnostyles* to *Coronopus*, or *Carara didyma* as it is now called. In the last six or seven years I have seen these two species growing close together in Quincy, Fla., Tuscaloosa, Ala., and on the campus of Louisiana State University, if not elsewhere, and the resemblance is very striking when the *Carara* is young, before it develops its horizontal stem and small racemes of flowers and fruit. Single leaves of the two plants put side by side can hardly be distinguished by external appearances, though very likely there are internal differences correlated with the presence of an aromatic oil in *Carara* as in most Cruciferae.

Although the two species can sometimes be found growing within an inch of each other, it is hard to find a place where they are both abundant enough, and unmixed with other vegetation, to be photographed satisfactorily in the field. And the dark soil on which they usually grow increases the difficulty. However, in May, 1937, I collected some of both between the sidewalk and street in a mediocre residential section of Tuscaloosa, and photographed them on a white background after they were dried, with the results shown in the figure. If they had been collected a few weeks earlier, when the stems of the crucifer were less developed, the resemblance would have been still closer.

Whether or not there is any significance in this resemblance is a puzzle. Several cases are known of pairs of unrelated plants which grow in the same habitat and bloom at the same time,

with flowers appearing very similar at a little distance, and probably pollinated by the same insects.[2] But just what advantage two weeds growing in the same habitat could derive from having similar foliage is not obvious. In the insect world cases are recorded of species protected from predatory enemies by their resemblance to another species with an offensive odor or taste, and there may possibly be some such factor involved here.

The *Carara*, which is widely distributed in the United States, is commonly supposed to be native of Europe; but Mohr mentions its occurrence in Brazil also, and it is possible that both

Gymnostyles nasturtiifolia (left) and *Carara didyma* (right), collected close together in Tuscaloosa, Ala., May 13, 1937, and photographed in the office on May 31. About one-third natural size. Note the close similarity of the leaves.

it and the *Gymnostyles* originated there, and developed a similarity of foliage in response to some environmental factor at present unknown.

Another somewhat similar case is that of *Rumex pulcher* and *Erysimum officinale* (formerly called *Sisymbrium officinale*). Both are roadside weeds, supposed to be natives of Europe,

[2] One of the most striking cases is that of *Viola pedata* and *Iris verna*, described in Torreya **6**: 192–193, 1906, and observed in other Alabama counties in later years.

blooming in the South in late spring, and drying up in summer. I have seen (and photographed) them growing close together in Tallahassee, Fla., and they resemble each other in height and especially in mode of branching. But that may not mean much, for one of them is presumably wind-pollinated and the other insect-pollinated. However, their mimicry may possibly give one of them a little extra protection from grazing animals.

A near relative of our *Gymnostyles*, formerly regarded as congeneric with it, deserves brief mention. It is *Soliva sessilis*, another native of South America, not mentioned by Chapman or Mohr, or in Small's Flora, but listed in Small's Manual, and said to range from northern Florida to Louisiana. It resembles the *Gymnostyles* in forming prostrate colonies, drying up and disappearing in summer, and having small heads of achenes, with corolla and stamens inconspicuous or wanting in most of the flowers; but the style instead of being weak as in *Gymnostyles* becomes a sharp spine when mature, readily attaching itself to a bare foot or paw that steps on the plant. And it has branched stems a few inches long, and finely dissected leaves.

I first met with this plant on a roadside near Evergreen, Ala., on April 21, 1927, and soon afterward found it common around Claiborne (in Monroe County), and in the city of Mobile. One would hardly suppose Dr. Mohr could have overlooked it if it had been as common in Mobile in his lifetime as it is now; but Claiborne was a flourishing place over 100 years ago, and is almost deserted now, and one would suppose that the plant would have had better opportunities to get established there in the busy days than in recent years. We may never know its history, though. I have also seen it in Tallahassee, Fla., and with Prof. Brown recently in Louisiana.

The putting of *Gymnostyles nasturtiifolia* and *Soliva sessilis* in different genera would seem amply justified if they had no nearer relatives (because different modes of dissemination hardly ever occur in the same genus, if for no other reason). But *Gymnostyles anthemifolia*, which Prof. Brown showed me around Baton Rouge, and I saw elsewhere in southern Louisiana last year, is a sort of connecting link, almost exactly intermediate (though hardly a hybrid). According to Small it occurs from northern Florida to Texas, and is native of South America, like the others.

In our books that describe these plants they are put in the tribe Anthemideae; but I am inclined to question that. For the typical Anthemideae are strongly—sometimes agreeably—scented (e.g., *Achillea*, *Chamomilla*, *Tanacetum*, *Artemisia*, *Santolina*), while the species in question are odorless or practically so. Then too most of the Anthemideae have conspicuous ray-flowers (e.g., *Anthemis*, *Chrysanthemum*), while our plants have no ray flowers, and what few corollas they have are so minute that I have never been able to detect them. Most of the flowers lack stamens also; and if they are Anthemideae they are degenerate members of the tribe. Their awned achenes, and lack of appeal to pollen-carrying insects, suggest an affinity to *Ambrosia*, which with a few other genera is now excluded from the Compositae proper.

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A correction

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In 1924 I described, under the name of *Calcophysoides balli*, a supposed cucurbitaceous fruit which had been sent to me by Professor O. M. Ball, and which came from Foard County, Texas.[1] This year a similar but smaller specimen was sent to Dr. Roland W. Brown of the U. S. Geological Survey from Idalia, Missouri, and a third from Brookings, South Dakota.

Due to the acumen of Dr. Brown it is now clear that all three specimens are baked clay artifacts and not fossil fruits, and the above name consequently should disappear in the limbo of mistaken identities, at least that is my hope.

My original specimen was cut transverse, as was also the specimen from Idalia, which I have not seen. These both show flow structure, irregular cavities, which before firing contained binder to make them come out porous. One had a baked fingerprint on the outside and the other a large cinder near the periphery. I quote these in part from Brown's letter to me. It has been suggested that these artifacts are of the nature of the so-called Cape Cod fire lighters, which seems a likely interpretation. The entire credit for clearing up the nature of these objects belongs to Dr. Brown and I am very glad of the opportunity of correcting my mistake.

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[1] Torreya, **24**: 5–7, 1924.